

Introduction:

What we have here is an article from the Fielden's Magazine 1900 covering what was then the recently opened Leen Valley Extension line of the Great Northern Railway. I think this is a valuable piece of railway history for it gives us some considerable detail about the line and its building, the photographs are extremely good. I have two copies of this article but both are in a very poor condition and that is why I have worked to reproduce it in a decent form.

Passenger traffic on the line ceased in 1931 and the line fully closed in 1968. Nowadays parts of the line make very good walking or cycling and you can download (free) my walk and history which also covers other railways in the Pleasley, Skegby and Teversal area. It is here:

<https://archive.org/details/TheRailwaysOfPleasleyTeversalSkegbyAWalkHistory>

I might suppose that readers can handle distances described in miles but chains might be another matter.

One chain equals 66 feet (22 yards) or just over 20 meters.

Stuart Watson

The Leen Valley Branch of the Great Northern Railway Co.

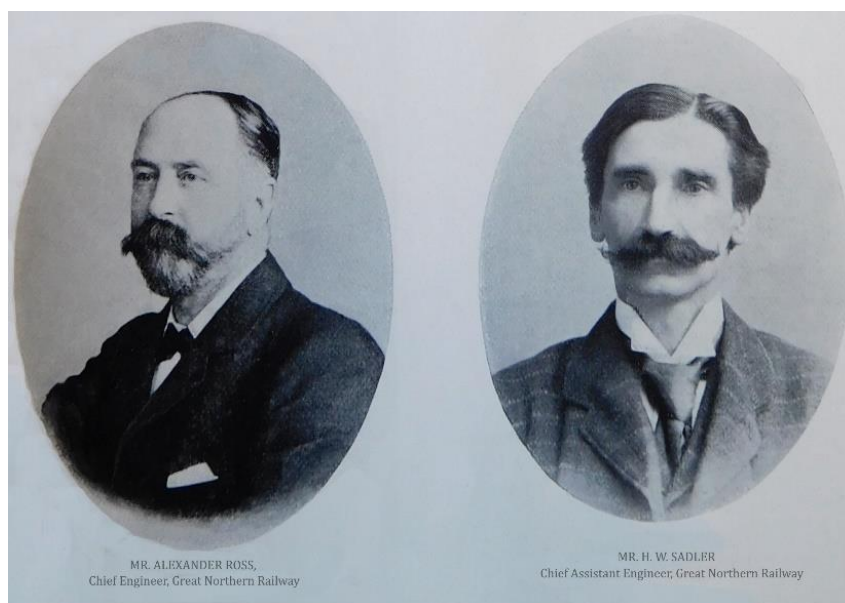
(By Our Special Commissioner)

Fielden's Magazine, Vol. 2, 1900 Jan-June, PP 627-640.

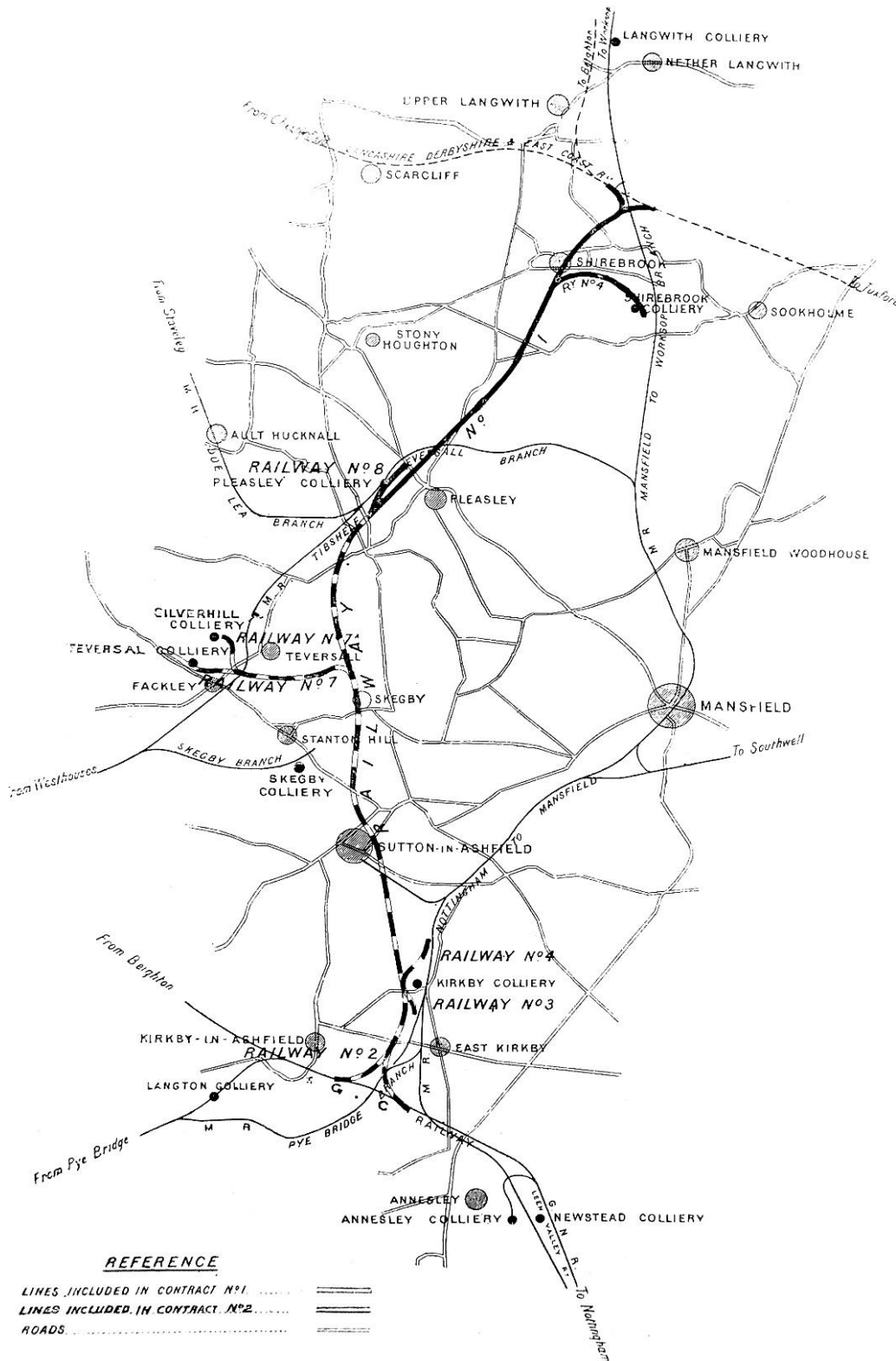
The opening of the Great Central Railway Company's new branch line to London commences a new phase in the history of the Great Northern Company. In meeting the competition which will inevitably follow the opening of so great an undertaking, the Directors of the Great Northern Railway Company have constructed in Manchester a large goods depot adjacent to the Central Station, the property of the Cheshire Lines Committee, in whose undertakings they are already interested to the extent of £4,000,000, a new line in Nottingham joining their existing line to the Central Station, which is a joint property belonging to the Great Northern and Great Central Companies, and have during the past five years, had under construction in Nottinghamshire and Derbyshire a line of some 14½ miles in length, tapping some of the most important collieries in those counties.

It is this portion of the enterprise we are particularly dealing with. The whole of the coal traffic carried from these districts will be brought into the marshalling yard at Colwick, five miles east of Nottingham, and there sorted prior to being sent south. From a very modest beginning the Colwick yard has become one of the most extensive in the kingdom, comprising as it does not less than 32 miles of sidings.

The work now about to be described is an extension of the Leen Valley Railway, which was opened for traffic in 1882.



The Leen Valley Branch of the Great Northern Railway Co.



MAP SHEWING THE ROUTE OF THE LEEN VALLEY BRANCH, G.N.R.



The new line has been made in two sections, the first commencing by a junction with the existing railway at Annesley, but to avoid the great expense of driving a tunnel through the Robin Hood Hills, an agreement was come to with the Great Central Railway Company for running powers through their Annesley tunnel. Branching off some 450 yards north of this, the actual construction of the new railway commences by a deep rock cutting; out of which 88,364 cubic yards have been excavated.

Emerging from this cutting, it crosses the Pye Bridge Branch of the Midland Railway by a bridge of two spans, one of which is not used, but is built to provide for future developments of the Midland Company. Continuing northwards it passes through the village of Kirkby, and then comes the first of the big collieries this line is provided for - that of the Butterley Company's Kirkby pit - which is reached by two branch lines, each 58 chains long, one leading to the empty sidings, the other to the fulls. One hundred and nineteen chains of sidings have been laid in, so that the accommodation is in no way neglected. At present only the "top-hard" coal seam (Known in south Yorkshire as the Barnsley bed) is worked at this pit.

There are two shafts, each of 15 ft. diameter and 365 yds. Deep, sunk through water bearing strata in the magnesium limestone, and lined for 110 yds. With cast-iron tubbing plates. Both shafts are arranged for drawing coal, but at present only the south or downcast shaft is used for that purpose.

The present output of coal is about 1,200 tons per day. When further developed about 4,000 tons per day could be obtained from these two shafts. The cages have two decks, each carrying two tubs of coal of 15 cwt. nominal capacity, and unloading simultaneously on two landings, one 7ft. 4in. above the other.

On the pit-bank, at each landing, there is an Everett patent tippler, designed to empty four tubs per minute into the main screen, whence the coal goes on to a travelling cleaning band 280 ft long, on which the coal is cleaned and sorted and handpicked into best hard locomotive coal, steam hard, soft cobbles, and mixed cobbles, and placed into trucks; the remainder is elevated and further cleaned and mechanically sized into screened cobbles, nuts, and smitham. The colliery is lighted throughout by electricity, and includes the usual shops and appliances, and is well equipped and situated for excellent clean coal into the midland and south country markets.

After leaving this colliery, the Sutton cutting is entered, containing 213,000 cubic yards of excavation. A feature of interest in this cutting, is the bridge under the Midland Railway Company's Sutton-in-Ashfield branch. So as not to interfere with the Midland Company's traffic at this point, a dumping was left in the cutting until the brick work of the abutments had been built in trench, and the new steel girders and flooring rivetted up on timber staging alongside. The bridge was then asphalted and ballasted and the permanent cut way laid ready upon it.

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After the last Midland train had passed up the branch at 12 o'clock midnight on a Saturday, the permanent way was torn out, and the new bridge drawn into position by means of wire ropes and crab winches, the whole lowered into position and fixed in time to allow the first train to pass over at 8 o'clock on the following morning.



Bridge over the Pye Bridge Branch of the Midland Railway

Situated in this cutting, at four miles from the commencement of the line, Sutton-in-Ashfield is reached, at which town a passenger station and goods depot have been built. It appears as though this were amply justified, in that the population of this town has increased from 7,574 in 1881 to 10,560 in 1891. The inhabitants are chiefly employed in the collieries and in the manufacture of hosiery.

The booking-hall, like the rest of the station buildings, is a substantially built stone erection, spanning the line, the platforms on either side being reached by a flight of stone steps. On both sides are gentlemen's and ladies' waiting rooms.

Leaving the station yard, the line enters the Skegby cutting, containing 105,000 cubic yards. It is 34 chains in length and of an average depth of 30 feet. The nature of the excavation was chiefly magnesian limestone, covering a big surface, but of very little vertical thickness. The stone is used in the district for road-mending and burning for lime.

At the north end of the cutting is the village of Skegby, where a passenger station and goods yard have been built. The booking-hall, offices, etc., are, like Sutton, built in stone, but instead of being over the line are situate on the road, and the platform is reached by means of a glazed brick sub-way and steps. On both the up and down platforms, ladies' and gentlemen's waiting rooms are provided and built of wood.



Bridge in Position, Carrying Midland Railway, Sutton-in-Ashfield Branch, Over Cutting

Skegby is only small place of about 3,300 inhabitants but is the centre of a big agricultural district, and near to this village is situate Hardwick Hall, one of the seats of the Duke of Devonshire.

About a quarter of a mile to the north of this village a branch line, 2 miles 19 chains in length, extends to the Silverhill and Teversal Collieries, the properties of the Stanton Coal and Ironworks Co., Ltd. The works on this length were not heavy, the excavation amounting but to 60,400 cubic yards. There were 10 bridges, chiefly built in stone with steel tops, the one under the Midland Railway Teversal Branch being rolled in in a similar manner to that already described at Sutton-in-Ashfield.

At Teversal Colliery there are two Shafts, the downcast being 14 ft. in diameter, and the upcast 11 ft. in diameter. Each are 217 yards deep to the "top-hard" coal. Only the downcast is used for drawing coal.

The cleaning and sorting arrangement are an exact duplicate of that in use at Pleasley.

At Silverhill Colliery there are two shafts, each 15 ft. in diameter and 418 yards deep to the black shale. Winding engines are fixed to both pits, the one drawing the whole of the black shale and part of the low main coal, and the other low main coal only. The underground haulage is done by an engine with one cylinder, 22 in. and 48 in. stroke, which is supplied with steam from a water-tube boiler of 95 h.p.

Leaving Skegby Junction, the main line follows the valley of the River Meden, and is carried on a long bank 52 chains in length, at the end of which the Pleasley Colliery, belonging to the Stanton Company, is reached.

It is to this point that Section No. 1 of these extensions was opened in the spring of last year.

There are 42 bridges, mostly built with masonry abutments and ordinary steel-plate girders with trough flooring, and 807,487 cubic yards of excavation were carried from the cuttings to embankments. The work took four years to complete.

The Leen Valley Branch of the Great Northern Railway Co.

At Pleasley Colliery, belonging to the Stanton Coal and Iron Co., there are two shafts, each 14ft.6 in. diameter, and 514 yards deep, sunk to the "Barnsley" or "top-hard" coal of Derbyshire. The cleaning and sorting of the coal into the various qualities is done by means of endless belts and jigging screens. There is an electric plant at this pit, conveying current to live motors underground, and 138 16-candle-power incandescent lamps.

The output of coal from the three collieries belonging to the Stanton Company is about 1,000,000 tons per year; 615 workmen's cottages are provided, and there are schools and institutes at Stanton Hill and Pleasley.

Contract No. 2 extends from Pleasley to Langwith, and the works are exceedingly heavy, and although only half the length of No. 1 the cost of construction exceeds it.

The bulk of the work lies in one big cutting containing 632,160 cubic yards of rock excavation. It is 1 mile, 18 chains in length, and of an average depth of 42 ft., the deepest point being at Shirebrook, where it is 58 ft. deep.

There are many striking features in the geological strata of this cutting. At the south end, for a distance of 44 chains, the stone is of a red tint, probably a white freestone coloured with an infiltration of iron. It makes a magnificent building stone, and is being used in the construction of all the bridges, dressing up into very fine face-work and ashlar. It is a stone similar to that found in quarries to the east of the railway at Mansfield, and was used in the terrace of Trafalgar Square, and spoken of by Sir Gilbert Scott as "one of the best building stones in the kingdom". This stone loses itself 44 chains north in the cutting, turning into loose boulders mixed with clay.



The Bridge Under The Midland Railway, Sutton-in-Ashfield, Ready to Be Drawn Into Position

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This, however, lasts for no great distance, but transforms into magnesian limestone, a massive irregular bedded crystalline yellow, speckled with black. Southwell Cathedral was built from this bed, and the foundation and lower part of the Houses of Parliament.

Reaching to 71 chains we come across 10 chains of sand and loam, emerging into a perfectly white freestone of a very hard nature. Unfortunately, all these beds of stone are very local, and, as stated, at a comparatively short distance they alter completely in character.

The cutting is being worked in three "lifts", the top being excavated by Ruston & Proctor's steam navvies to the full top width, and a depth of about 14ft., the excavation having to be blasted by gelignite or other explosives before being filled. Rock-drills driven by compressed air are used for the purpose of putting down the holes to receive the explosives.

The second "lift" is proceeded with when the steam navvies have got sufficiently far ahead to give room for driving a "gullet" about 14ft. wide. The rock is filled into skips by hand, which are then hauled out of the "gullets" by means of steam cranes, and loaded into wagons standing on a separate road.

When this stage is sufficiently advanced, wagons are placed on the wings and filled by hand, as many as 20 wagons being worked in a set, the whole process being repeated on the bottom lift.



Sutton-in-Ashfield Station and Yard

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The cutting was worked both at the north end and the south in a similar manner; two Ruston & Proctor's navvies and eight steam cranes were used in addition to the hand gangs excavating the wings.

The cutting was worked in ten different places at the same time, and necessitated the employment of eight locomotives to carry the excavation to the banks. It can readily be imagined from the employment of so much power in one cutting and the manner it is laid out, that great progress has been made, it being quite anticipated that it will be completed by the first of June of this year.

A start having been made on the 12th Jan., 1898, this vast amount of rock will have taken less than two-and-a-half years to excavate and tip into embankments.

The boring in the "gullets" and in front of the steam navvies was done by machine drills, two makes being used, that by "Schram" being driven solely by compressed air, and the "Ingersoll-Sergeant" by steam and compressed air.



End of Section No.1, Shewing Chimneys of Pleasley Colliery in Distance

As many as eighteen drills were being worked at the same time. A special feature of the "Schram" type of machine is that they work on the compound principle, i.e., the charge of compressed air which has been used to make the forward stroke, instead of being exhausted, is again utilised to make the backward stroke, with the result that there is only one exhaust for each double stroke instead of two as in rock drills of ordinary construction.

The effect of this is that considerable economy in the consumption of compressed air is effected, which means a corresponding saving in fuel, a less water supply (for boilers), etc., which it will be readily understood is a matter of considerable importance on a contract of this description. The compressed air was supplied from one of Schram's direct acting tandem air compressors driven by a loco-type boiler.



Quarrying The Red Sand Stone Out Of The Cutting For Bridge Building



At Work On The Wings : Bottom Lift Shewing Cranes At Work In The Gullet In The Distance

The cylinders of this compressor are water jacketed to counteract the heat which naturally arises through the air being compressed in the cylinder. The air is passed through pipes to a general receiver, and from thence along the top of the cutting through wrought iron pipes with T pieces at regular intervals, to which branch pipes are attached from time to time as the work proceeds, and connected to the drills by means of a flexible rubber hose.

Many special features are also embraced in the Ingersoll-Sergeant 3¼ in. diameter cylinder drill. The mounting for the drill is a simple tripod with a universal joint arrangement. It has telescopic legs, with pointers and set-screws, so that it can be fixed at any level to suit the uneven surfaces which are generally met with on the slopes of railway cuttings. The jaw and saddle at apex of tripod embraces the conical spigot attached to the cradle of drill, and is capable of being adjusted to any varying position from horizontal to perpendicular. This percussive rock-drill combines an independent valve, operated through an auxiliary valve which in turn, is actuated by shoulders upon the piston.

This arrangement opens or closes the steam or air passages, releasing the pressure at each end of the main valve alternately. There are only two quick-moving parts – the valve and the piston - and one obvious advantage of this reduced number of working parts is that it is less liable to get out of order.



Driving the Gullet Bottom Lift, North End of Shirebrook Cutting.

A variable stroke can be obtained at will, and without cushioning the blow simply by feeding the machine close up to the rock. This is a great advantage, enabling a hole to be started with ease, and can only be attained properly by the machine having a positive valve motion.

The time occupied in drilling varies considerably according to the nature of the rock operated upon, and in working on the wings of a cutting, shifting the machine from one point to another occupies considerable time, especially when a crane is out of reach. A depth 12 ft. in an hour, including changing bits, pumping out hole, etc., has often been accomplished.

At the end of the big cutting is the site of the Shirebrook station yard, and the junction of the branch line, $\frac{3}{4}$ mile long, to the Shirebrook Colliery, a new undertaking, the pit not having long been opened. At this point there are two shafts, each 19 ft. in diameter, sunk to the Barnsley bed or top hard coal of Derbyshire. The depth of this seam from the surface is 544 yds. The plant is of modern type, the workshops being the largest and most commodious in the county.



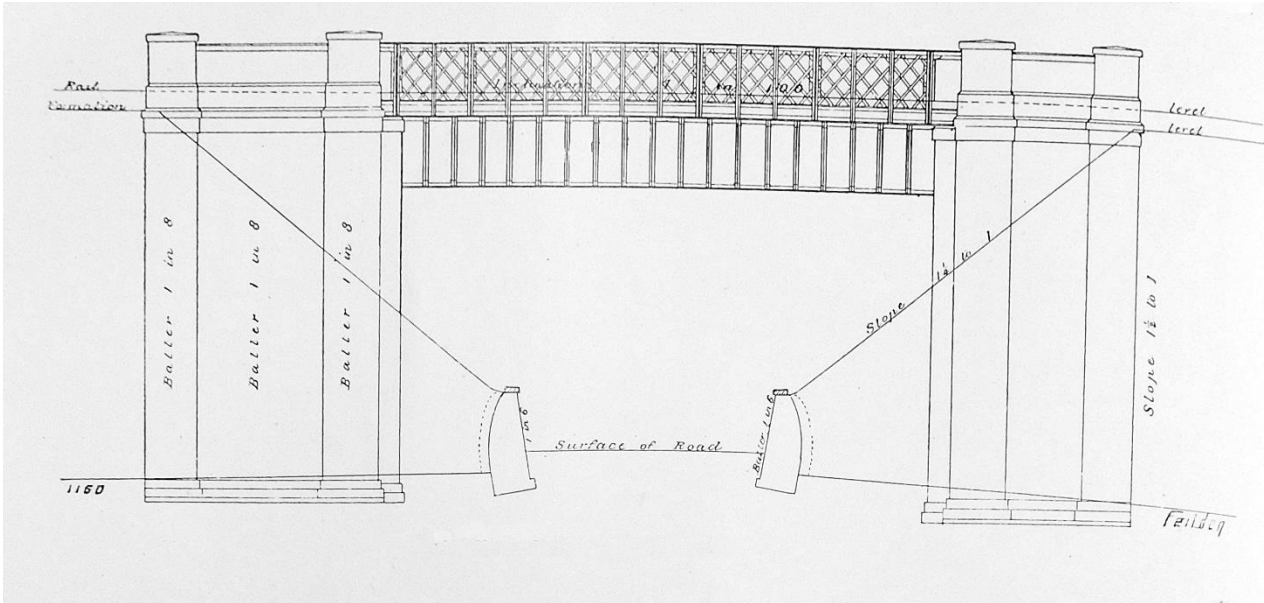
Shirebrook Road Bridge

The output is now about 400,000 tons per year, but is expected to reach 750,000 tons. The quality of the coal compares very favourably with the same class of coal worked at the neighbouring collieries. There is a large model village in connection with the colliery, consisting of about 400 well-built and prettily situated houses.

Proceeding $1\frac{1}{2}$ mile northwards, the main line passes over a deep bank, under which there are five big bridges.

The accompanying photograph of Shirebrook Road bridge illustrates the type of them all, which when completed look exceedingly solid and well. They are mostly of steel, with masonry abutments and wings; the engineer preferring in all cases not to adopt arches, owing to the numerous colliery workings underneath.

The Leen Valley Branch of the Great Northern Railway Co.

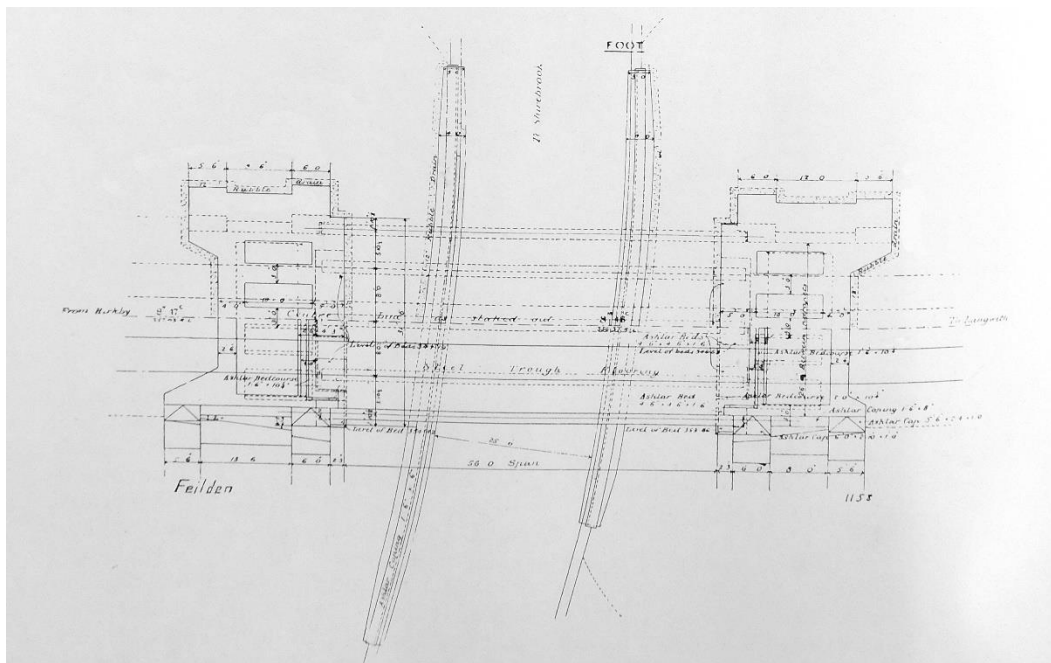


Shirebrook Road Bridge, East Elevation

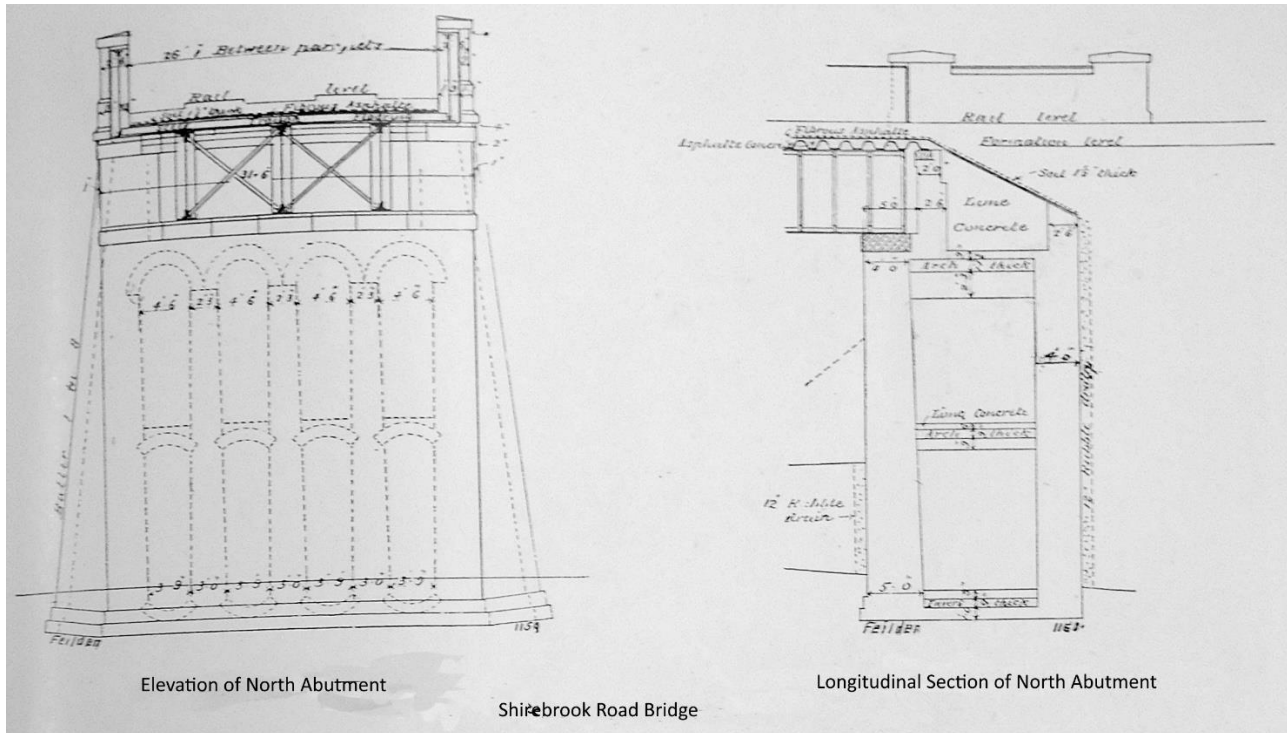
The masonry is faced throughout with the red stone quarried from the cutting, the tooled ashlar in the pilaster caps, coping and girder beds being of Derbyshire grit stone.

The largest bridges are four under-bridges across public roads, in the big Shirebrook Embankment, between 8 miles 48 chains and 9 miles 3 chains, and the Wood Lane over-bridge at 7 miles 52 chains.

The bridge over Shirebrook road may be taken as typical of the former class. It is 56 ft. in clear span and 37 ft. high from road to rail level. The abutments are pocketed, and the weight on the concrete foundation is about 3½ tons to the square foot, including rolling load.



Shirebrook Road Bridge - Half Plan of Superstructure and Half Plan Above Footings



There are no wing walls, as the abutments are of the type known as "block" abutments, and the toe of the embankment is kept from coming into the roadway by retaining walls 6 ft. high, built parallel to, and $15\frac{1}{2}$ ft. from the face of the abutments, thus giving a clear roadway width of 25 ft.

The main girders, three in number, are of the ordinary plate type, and are so spaced as to be equally loaded. They are 63 ft. 6 in. long, 7 ft. deep, and 1 ft. 8 in. wide, placed 8 ft. centres, and braced together with a cross bracing of 6 in. x 3 in. x $\frac{1}{2}$ in. T irons. They are decked over with steel trough flooring, filled with asphalt concrete, the ends of which rest on the bottom flange of the parapet girders, which are of the lattice type and 7 ft. 3 in. deep.

There is a clear width 26 ft. 1 in. between parapets. The section of the outside main girders at the centre consists of web $\frac{3}{8}$ in. thick, and two $\frac{1}{2}$ in. plates in both top and bottom flanges connected with web by 4 in. x 4 in. x $\frac{5}{8}$ in. angle irons; the flanges of the central main girder $\frac{1}{16}$ in. thicker than those of the outside girders, but in all other respects the dimensions are identical.

The Wood Lane Bridge, which has the longest span of any on the line, carries a public road over the railway at 7 miles 52 chains. The skew span of this bridge is 81 ft. 4 in., and the two main girders are 93 ft. 6 in. in length, 8 ft. 6 in. deep, and placed 19 ft. centres. Cross girders are 26 ft. 2 in. in length, 2 ft. deep, placed 10 ft. centres, and rest on the top of the main girders, and these are again decked over with trough flooring filled with asphalt concrete.

The flanges of the main girders, which are 2 ft. wide, are made up of two $\frac{1}{2}$ in. and two $\frac{7}{16}$ in. plates at the centre, the web plate being $\frac{7}{16}$ in. thick. The parapets consist of light lattice girders, 6 ft. high above the level of the road, and the total depth of steelwork from the top of the parapet to the bottom of the main girders is 19 ft.

There is a small cutting from 9 miles 10 chains to 9 miles 39 chains, after which the line connects with the Lancashire, Derbyshire and East Coast Railway at the Langwith Junction station, thus gaining access on the west to Chesterfield, on the north to Sheffield, and on the east to the "Dukeries."

There are in all 20 bridges on this Contract No. 2, containing some 14,000 cubic yards of masonry and 869 tons of steelwork.

The Leen Valley Branch of the Great Northern Railway Co.

In addition to the extensive coal traffic certain to be obtained, a large excursion traffic is anticipated to the "Dukeries," including Welbeck, the seat of the Duke of Portland; Clumber, the seat of the Duke of Newcastle; Thoresby, the seat of Earl Manvers; Rufford Abbey, the seat of Lord Saville; and Hardwick Hall, one of the seats of the Duke of Devonshire.

At Chesterfield are situated the works of Messrs. C. Markham & Co., where it may not be generally known, the Schram air compressors and rock drills are made, and a visit to these works is well worth anyone's time, for there may be seen all the very latest electrical appliances, and one of the finest tool shops in the country.

The work in connection with this extension was commenced under Mr. Richard Johnson, M.I.C.E., the late chief engineer to the Great Northern Railway Co.: but since his retirement by Mr. Alexander Ross, M.I.C.E., who succeeded him. Acting under Mr. Ross are Mr. H. W. Sadler, M.I.C.E., chief assistant, and Mr. J. Lee, Assoc. M.I.C.E., resident engineer. Mr. W. H. Hutchinson, Assoc. M.I.C.E. of Mansfield is the contractor of contract No. 2. The Horsely Co., Tipton, supplied the steel work for the first section, and the Butterley Coal & Iron Co. that of Section No. 2.



General View of the Big Bank at Shirebrook